INSTRUCTIONS

-J03825 REV. 2010-12-15

SCREAMIN' EAGLE TWIN CAM 103 (1690 CC) CONVERSION KIT

GENERAL

Kit Number

29877-06 (Black) and 29876-06 (Silver)

Models

These kits fit 2006 Touring models equipped with Electronic Fuel Injection (EFI).

Additional Parts and Tools Required

This kit requires the separate purchase of the following parts and tools which are available from a Harley-Davidson dealer.

- Camshaft/Crankshaft Sprocket Locking Tool (HD-43614)
- Camshaft Remover/Installer (HD-43644)
- Loctite® 243 (blue) 99642-97

Proper installation of this kit requires the use of Digital Technician™ at a Harley-Davidson dealer.

⚠WARNING

The rider's safety depends upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333a)

NOTE

This instruction sheet references Service Manual information. A Service Manual for your model motorcycle is required for this installation and is available from a Harley-Davidson dealer.

Kit Contents

See Figure 13 to Figure 16, and Table 1 to Table 4.

NOTES

Installation of this kit by an authorized Harley-Davidson dealer will not impact your limited vehicle warranty.

This Conversion kit is intended for High Performance applications only. This engine related performance part is legal for sale or use in California on pollution controlled motor vehicles. Engine related performance parts are intended for the experienced rider only.

The Product Information Label contained in this kit is a requirement of the California Air Resource Board (CARB) emission regulation. Place the label on the right side of the frame directly beneath the VIN sticker. This label is not required outside the state of California.

REMOVAL

⚠WARNING

When servicing the fuel system, do not smoke or allow open flame or sparks in the vicinity. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00330a)

1. Remove maxi-fuse. Refer to MAXI-FUSE INSTALLATION in Service Manual.
2. Remove existing air cleaner assembly. Discard filter element, backplate, and air cleaner cover insert but save remaining parts. Refer to AIR CLEANER REMOVAL in Service Manual.
3. Remove existing exhaust system. Discard mufflers but save remaining parts for kit installation. Refer to EXHAUST SYSTEM REMOVAL in Service Manual.
4. Remove engine from chassis following the instructions in the Service Manual.
5. Remove induction module. Refer to appropriate FUEL INJECTION section in Service Manual.
6. See Figure 1. Remove and save screw (with pilot sleeve) to release fuel supply tube clamp.

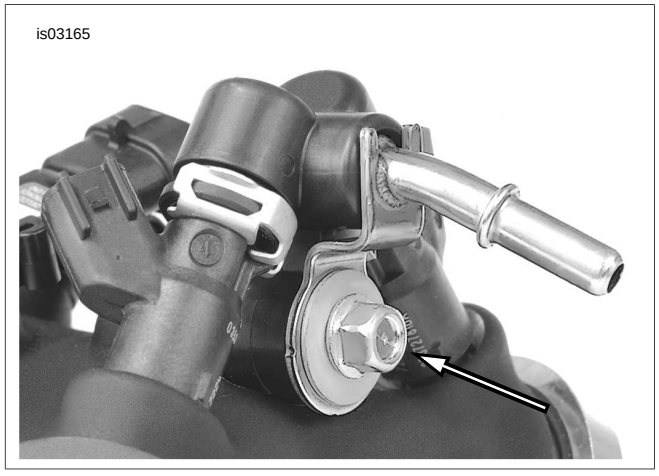
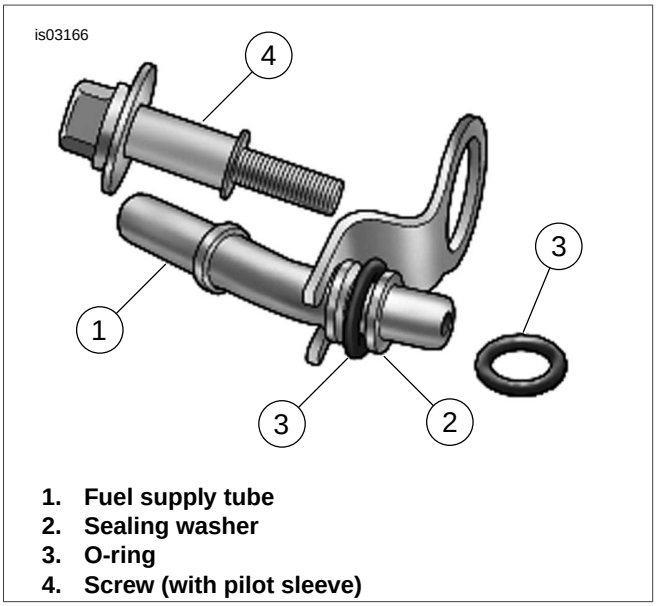


Figure 1. Fuel Supply Tube Clamp Screw

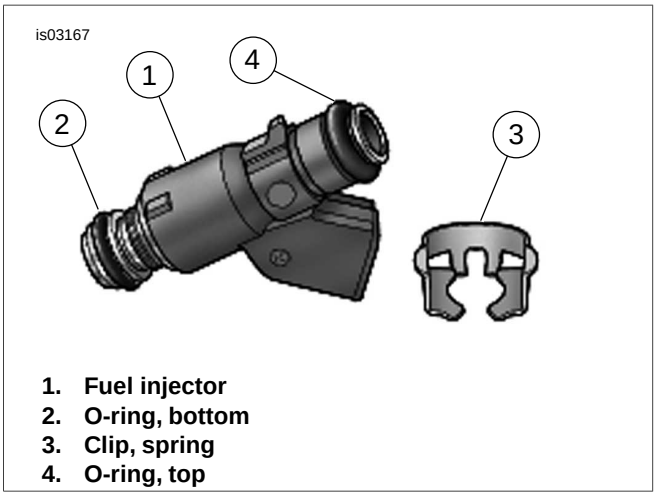
7. See Figure 2. Pull fuel supply tube (1) from fuel rail.



1. **Fuel supply tube**
2. **Sealing washer**
3. **O-ring**
4. **Screw (with pilot sleeve)**

Figure 2. Fuel Supply Tube Assembly

8. Remove sealing washer (2) and O-ring (3) from fuel supply tube. Remove second O-ring (3) from fuel rail bore. Discard sealing washer and O-rings.
9. See Figure 3. Pull fuel injectors (1) with attached fuel rail from induction module. To overcome the resistance of the bottom O-ring (2) on both fuel injectors, gently rock assembly back and forth while pulling.
10. Remove spring clips (3) from fuel injectors. Pull fuel injectors from fuel rail. To overcome the resistance of the top O-ring (4) on both fuel injectors, gently rock assembly back and forth while pulling.
11. Disassemble engine top end, engine bottom end, crankcase, and crankshaft. Refer to appropriate ENGINE sections in Service Manual.



1. **Fuel injector**
2. **O-ring, bottom**
3. **Clip, spring**
4. **O-ring, top**

Figure 3. Fuel Injector Assembly

INSTALLATION

Inspect Cam Clearance

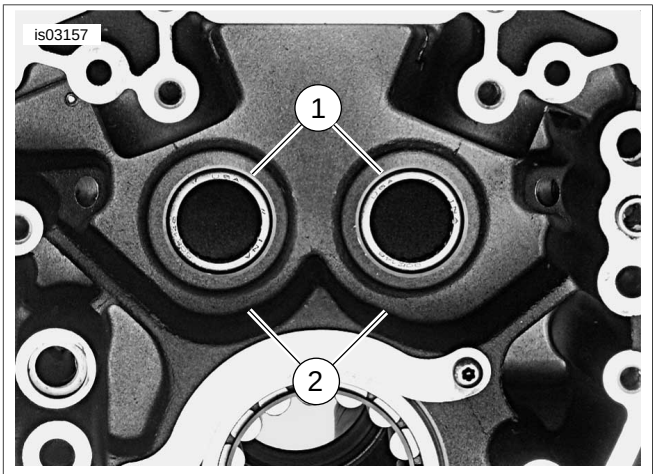
NOTICE

A clearance problem between the new cam lobe and crankcase housing may exist on certain older model engines. Failure to maintain proper clearance could result in severe engine damage. (00391b)

1. See Figure 4. Prior to starting assembly procedures, insert new cams from kit into inner needle bearings (1) located in the right side crankcase and check for a minimum of 0.030 in. clearance between highest lift point of cam lobes and crankcase housing (2) with feeler gauges.

NOTE

If inadequate clearance is detected, crankcase housing must be machined to provide 1.060 in. Radius clearance from center of each cam bearing bore. After machining, recheck for minimum of 0.030 in. clearance.



1. **Inner needle bearings**
2. **Crankcase housing clearance area**

Figure 4. Inspect Cam Clearance

2. Prior to engine assembly, inspect chain tensioner guides, chain guide bracket, and balance chain. Refer to inspection procedures in Service Manual.

Install Flywheel Assembly

See Figure 16. Install flywheel assembly (13) from kit following the instructions in the Service Manual.

Remove Existing Cam Bearings

NOTE

Both crank and primary cam sprocket flange screws are specially hardened while the flat washers are of a special diameter and have ground surfaces. Therefore, use only the parts provided in the Cam Drive Gear Retention Kit (25533-99A) when performing this upgrade. The crank and primary cam sprocket flange screws are ***not*** *interchangeable.*

1. Remove existing crank and primary cam sprocket flange screws and washers according to instructions in Service Manual. Discard cam drive sprocket flange screws and washers.
2. Remove existing cam drive sprocket according to instructions in Service Manual.

3. Remove and discard existing cam bearings. Refer to ENGINE, BOTTOM END OVERHAUL Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) section(s) of appropriate Service Manual.

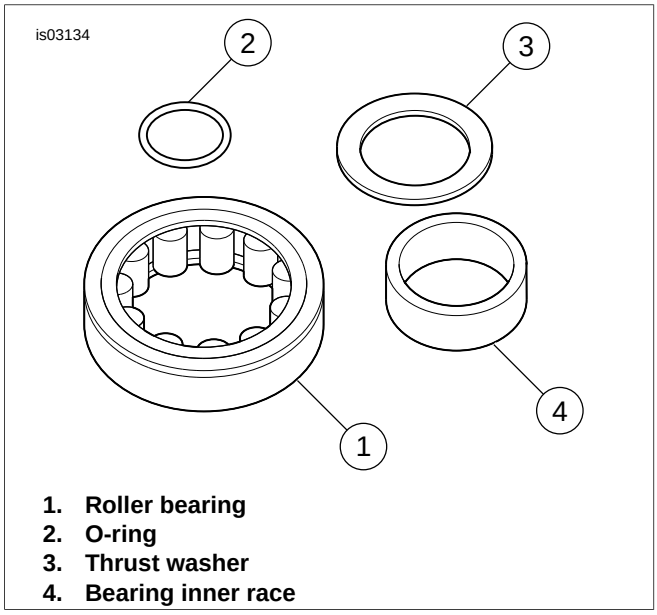
Install New Cam Bearings

NOTICE

To center thrust washer, be sure o-ring is installed in relief groove. Damage to bearing cage and engine can occur if thrust washer is not centered. (00473b)

NOTE

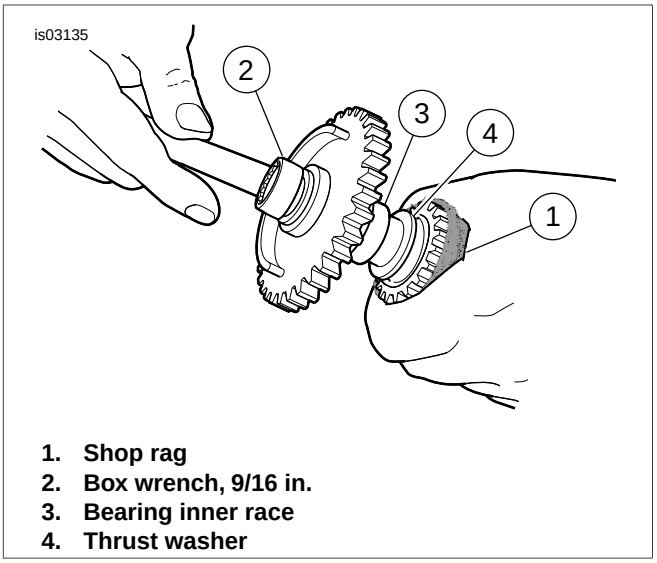
If not enough of the splined shaft is exposed to install the sprocket, leave out the spacer and proceed to Step 1e. Once the bearing inner race has been started onto the machined area, remove the flange screw, washer, and sprocket, then assemble using the spacer. Repeat Step 1e to fully install bearing inner race.



1. **Roller bearing**
2. **O-ring**
3. **Thrust washer**
4. **Bearing inner race**

Figure 5. Rear Cam Roller Bearing Kit

1. See Figure 5. Install rear cam roller bearing kit (Figure 15, item 8) onto rear camshaft.
   a. Install O-ring in grinding relief groove. Groove is on the splined end between the machined area and the secondary cam sprocket. Exercise caution to avoid stretching or breaking the O-ring. Since the O-ring is not sold separately, damage will require purchase of new roller bearing kit.
   b. Slide thrust washer down rear camshaft until centered over O-ring in grinding relief position.
   c. Slide bearing inner race down rear camshaft until contact is made with shoulder of machined area.
   d. Install primary cam sprocket spacer and sprocket on camshaft, and secure using **thicker** flat washer and **long** flange screw.
   e. See Figure 6. Wrap a shop rag (1) around camshaft to get a firm grip and also to protect hand from sharp edges of sprocket. Using a 9/16 in. box wrench (2), turn flange screw in a clockwise direction. Bearing inner race (3) is fully installed when it makes firm contact with the thrust washer (4).
   f. Verify thrust washer is locked in place and **cannot be rotated**. If necessary, install shaft in vise using brass jaw inserts, and further tighten flange screw until desired result is achieved.
   g. Remove flange screw, flat washer, sprocket, and spacer.



1. **Shop rag**
2. **Box wrench, 9/16 in.**
3. **Bearing inner race**
4. **Thrust washer**

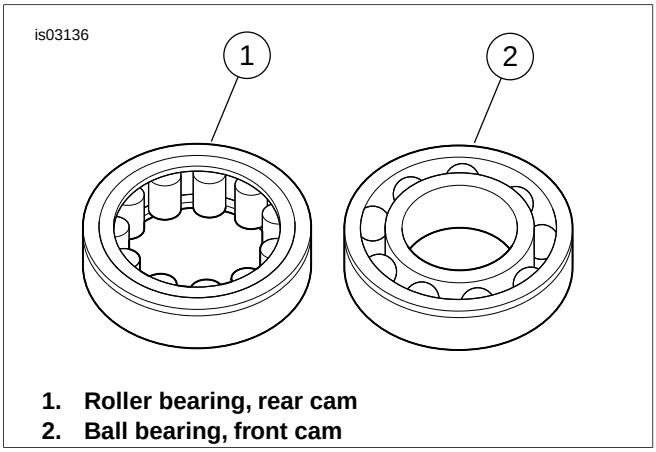
Figure 6. Install Bearing Inner Race (with O-Ring and Washer)

NOTES

Be aware that the front and rear cam bearings are not interchangeable. The rear cam utilizes a roller bearing while the front cam utilizes a ball bearing (See Figure 7).

Bearing fit may be a light press or slightly loose fit. If deemed necessary, clean bearing O.D. and apply Loctite 243 (blue) before installation, but exercise caution to avoid getting compound on rollers or bearing I.D.

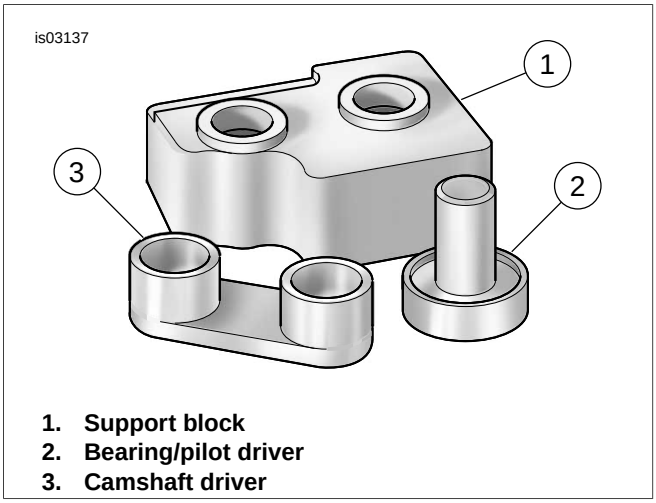
2. Install new cam bearings into cam support plate according to the following:
   a. See Figure 8. Obtain the Camshaft Remover/Installer (HD-43644).
   b. With the secondary cam chain side facing upward, place cam support plate on support block, so that outer races of bearings are properly supported. Note that one corner of the support block is contoured to accommodate the chain guide blocks cast into the front of the support plate.
   c. Center new bearing over bearing bore with the lettered side up. Slide pilot shaft of bearing driver through bearing into hole of support block.
   d. See Figure 9. Center bearing driver under ram of arbor press. Press on driver until bearing makes firm contact with counterbore in cam support plate. Repeat Steps 2a through 2c to install second bearing.



1. Roller bearing, rear cam
2. Ball bearing, front cam

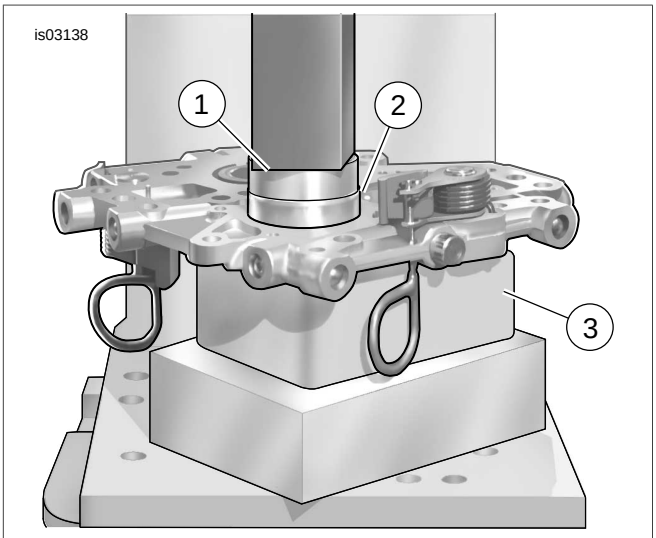
Figure 7. Cam Bearings

3. Apply Loctite 243 (blue) to threads of four bearing retainer plate screws.
4. Using a T20 Torx® drive head, secure bearing retainer plate to cam support plate.
5. Tighten four bearing retainer screws to 20-30 **in-lbs** (2.3-3.4 Nm) in a crosswise pattern. Verify that hole in retainer plate is properly aligned with secondary cam chain oiler.



1. Support block
2. Bearing/pilot driver
3. Camshaft driver

Figure 8. Camshaft Remover/Installer

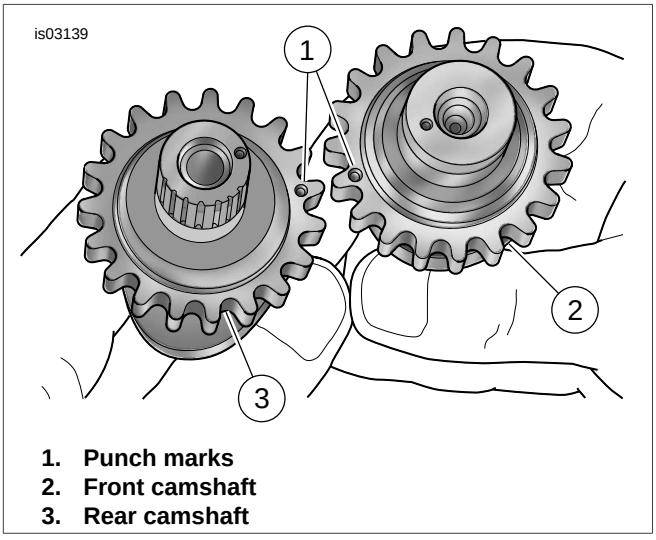


1. Bearing/pilot driver
2. Bearing
3. Support block

Figure 9. Press Bearings into Cam Support Plate

Install Camshafts

1. Start camshafts into cam bearings.
2. Place cam support plate back on support block, if removed. The block properly supports inner races of bearings as camshafts are installed.
3. See Figure 10. Align punch marks on teeth of secondary cam sprockets (outboard faces). Using a colored marker, carefully mark the punch mark locations on the inboard side of the sprocket teeth. These marks are needed to observe proper orientation of the camshafts when they are pressed into the bearings.



1. Punch marks
2. Front camshaft
3. Rear camshaft

Figure 10. Align Punch Marks on Teeth of Camshaft Sprockets

4. Place secondary cam chain around the sprockets of both the front and rear camshafts. To maintain the original direction of rotation, be sure that the colored mark placed on the chain link during disassembly is facing opposite the cam support plate during installation.

5. Orient the camshafts so that they are positioned on opposite ends of the chain, and then verify that the colored marks placed on the inboard side of the sprocket teeth are still in alignment.

6. Maintaining the position of the camshafts on the chain with the colored marks in alignment, place the sprocket ends of the camshafts into the bearings.

NOTE

Be sure not to mix camshafts during the press procedure. The rear camshaft, which can be identified by the splined shaft, must go into the roller bearing at the rear of the cam support plate.

7. Place cup of camshaft driver over end of front camshaft **only**.

NOTICE

During press procedure, keep tensioner shoe clear of chain to prevent damage to tensioner assembly. (00474b)

8. Center end of front camshaft under ram and slowly apply pressure to driver just to start front camshaft into bearing I.D.

NOTICE

Be sure rear camshaft is aligned during press procedure. Misalignment can cause inner race to catch on bearing rollers resulting in bearing damage. (00475b)

9. Slowly apply pressure to driver on front camshaft, while wiggling rear camshaft as necessary to guide inner race between bearing rollers.

10. When inner race on rear cam is started into roller bearing, apply pressure to driver until front camshaft is fully seated. If necessary, keep finger pressure at top of rear camshaft so that assembly remains square and inner race moves to installed position in roller bearing.

11. After installing new cams, check for proper cam to cam timing using straightedge along punch marks as described in Service Manual.

12. Install retaining ring from kit in groove at end of front camshaft.

NOTES

Inspect cam needle bearings in crankcase and replace if necessary.

Replace oil pump to cam plate O-ring (Figure 15, item 2) and cam plate to crankcase O-ring (Figure 15, item 6).

Install Cam Support Plate

Install cam plate according to ENGINE, BOTTOM END OVERHAUL Cam Support Plate, Disassembly/Assembly instructions in applicable Service Manual.

Install Rear Cam Sprocket, Crank Sprocket, and Primary Cam Chain

1. Apply a thin film of clean H-D 20W50 engine oil to the splines of the rear cam.

2. Install splined sprocket onto rear camshaft. Refer to ENGINE, BOTTOM END OVERHAUL Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) section(s) in appropriate Service Manual. Use spacers provided in kit in place of those listed in Service Manual.

NOTES

Verify alignment at crank and primary cam sprocket punch marks as described in Service Manual.

Verify alignment at crank and primary cam sprocket faces. Use spacers provided in kit to maintain alignment at plus (+) or minus (-) 0.01 in.

3. See Figure 15. Use cam flange screw (12), washer (11), crank flange screw (10), and washer (9) from kit.

⚠WARNING

Apply threadlocker to maintain clamp load on flange bolt. A loose flange bolt can cause engine failure, which could result in death or serious injury. (00476c)

4. Install new flange screws and washers as follows:
   a. Verify threads are clean and free from oil then apply Loctite Primer 7649.
   b. Apply Loctite® 262 (red) 94759-99 to threads of flange screws.
   c. Apply a thin film of clean H-D 20W50 engine oil to both sides of flat washers.
   d. Start flange screw with flat washer to secure crank sprocket to end of crankshaft.
   e. Start flange screw with flat washer to secure primary cam sprocket to end of camshaft.
   f. See Figure 11. Position Camshaft/Crankshaft Sprocket Locking Tool (HD-42314) between the crank and primary cam sprockets to prevent rotation. The handle of the tool is stamped "Cam" and "Crank" for proper orientation.
   g. Tighten crank and primary cam sprocket flange screws to 15 ft-lbs (20.3 Nm).
   h. Loosen each flange screw one full turn.
   i. Tighten crank flange screw to 24 ft-lbs (32.5 Nm) final torque value.
   j. Tighten primary cam sprocket flange screw to 34 ft-lbs (46.0 Nm) final torque value.
   k. Remove sprocket locking tool and follow instructions in Service Manual for unloading primary cam chain tensioner.

5. Install cam cover according to ENGINE, BOTTOM END OVERHAUL, Cam Support Plate, Disassembly/Assembly instructions in applicable Service Manual.

NOTE

Replace cam cover gasket (Figure 15, item 3).

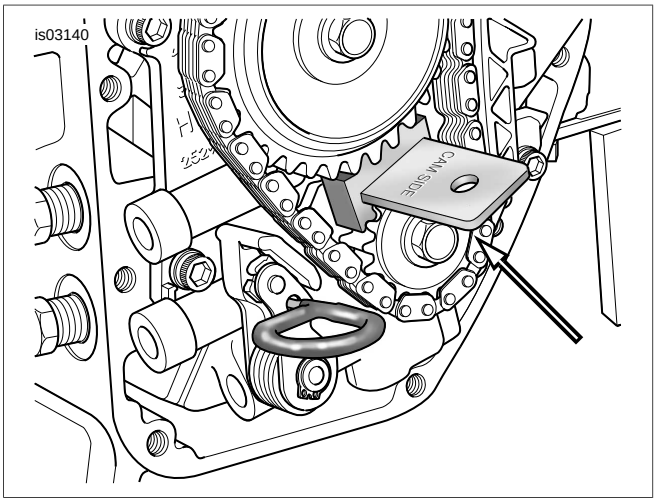


Figure 11. Camshaft/Crankshaft Sprocket Locking Tool

Install Engine, Fuel Injection, and Clutch Spring

1. Assemble remaining engine components. Refer to appropriate ENGINE sections in Service Manual.
2. Install engine in chassis following the instructions in the Service Manual.
3. See Figure 3. Apply a thin coating of clean engine oil to O-rings (2, 4) from kit on fuel injectors (1).
4. Push electrical connector side of fuel injectors into fuel rail.
5. See Figure 12. With the concave side toward the fuel rail, install spring clip into slot on fuel injector. In the installed position, openings (1) in side of clip engage lip (2) of fuel rail, while fork (3) at back of clip captures fuel injector tab (4).
6. Rotate fuel injectors, so that the electrical connectors are on the outboard side. Push fuel injectors into the induction module bores until fuel rail tab (5) engages machined slot at top of induction module.

1. **Opening**
2. **Lip**
3. **Fork**
4. **Injector tab**
5. **Rail tab**

Figure 12. Installation of Spring Clips

7. See Figure 2. Slide O-ring (3) from kit down shorter neck of the fuel supply tube (1) until it contacts the collar. Slide sealing washer (2) from kit down tube until it contacts O-ring. Install second O-ring (3) in fuel rail bore.
8. See Figure 1. Push fuel supply tube into fuel rail bore until clamp is seated on round step of fuel rail. Install screw (with pilot sleeve) previously removed and tighten to 90-110 **in-lbs** (10.2-12.4 Nm).
9. Install induction module. Refer to appropriate FUEL INJECTION section in Service Manual.
10. Install clutch diaphragm spring (Table 2, item 15) from kit following the instructions in the Service Manual.

Install Mufflers and Air Cleaner

NOTE

When installing the exhaust system, first install the rear and front cylinder exhaust pipes, shields, and related components.

1. See Figure 16. Install exhaust system using mufflers (1, 2) from kit and parts previously removed. Refer to EXHAUST SYSTEM INSTALLATION in Service Manual.
2. See Figure 13. Install air cleaner assembly using backplate (9), filter element (10), and air cleaner cover insert (11) from kit. Refer to AIR CLEANER INSTALLATION in Service Manual.

Final Assembly

Install maxi-fuse. Refer to MAXI-FUSE INSTALLATION in Service Manual.

Recalibrate ECM

NOTICE

You must recalibrate the ECM when installing this kit. Failure to properly recalibrate the ECM can result in severe engine damage. (00399b)

Download the new ECM calibration using the Digital Technician™ at a Harley-Davidson dealer.

SERVICE PARTS

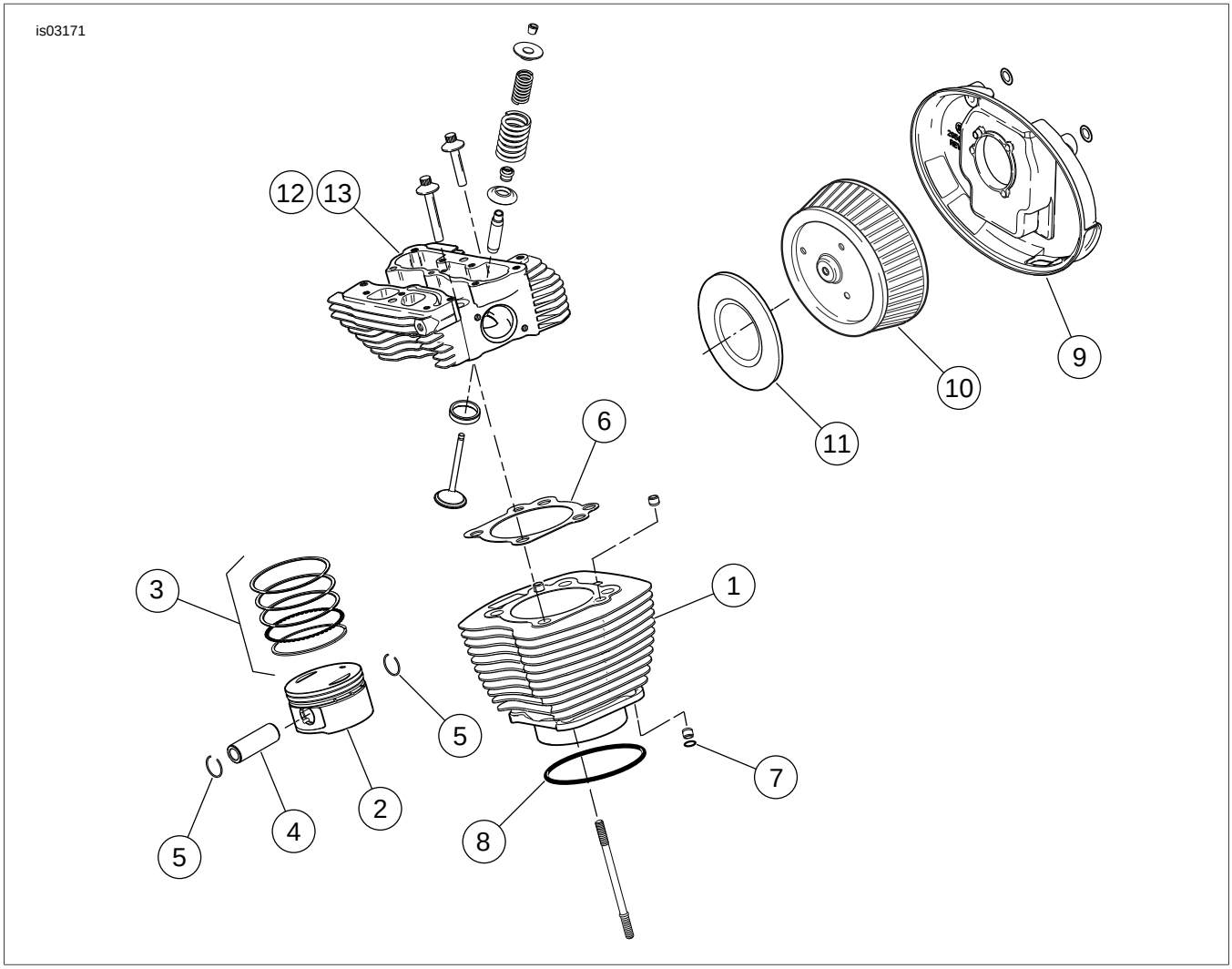


Figure 13. Service Parts: Screamin Eagle Twin Cam 103 (1690 CC) Conversion Kit

Table 1. Service Parts: SE Twin Cam 103 (1690 CC) Conversion Kit

Item	Description (Quantity)	Part Number		Item	Description (Quantity)	Part Number
1	1550 Cylinder assembly (Black) (2) (used in Kit 29877-06)	16547-99		9	Backplate assembly, air cleaner	29697-02A
	Cylinder assembly (Silver) (2) (used in Kit 29876-06)	16548-99		10	Element, filter	29509-06
2	Piston (2)	Not Sold Separately		11	Insert, air cleaner cover	29480-03
3	Piston ring set (2)	21918-99		12	Cylinder head, front (black)	17150-06
4	Piston pin (2)	22132-99			Cylinder head, front (silver)	17149-06
5	Piston pin circlip (4)	22097-99		13	Cylinder head, rear (black)	17152-06
6	Head gasket (2)	16787-99A			Cylinder head, rear (silver)	17151-06
7	O-ring, cylinder deck ring dowel (2)	11273		--	Piston kit (includes items 2 through 5)	22421-03
8	O-ring, cylinder spigot (2)	11256		Notes: Do not install O-ring (item 7) to top cylinder dowels. Refer to 2006 FLHTCUSE Parts Catalog, part number 99428-06 for individual components of cylinder head assemblies (items 11 and 12).		

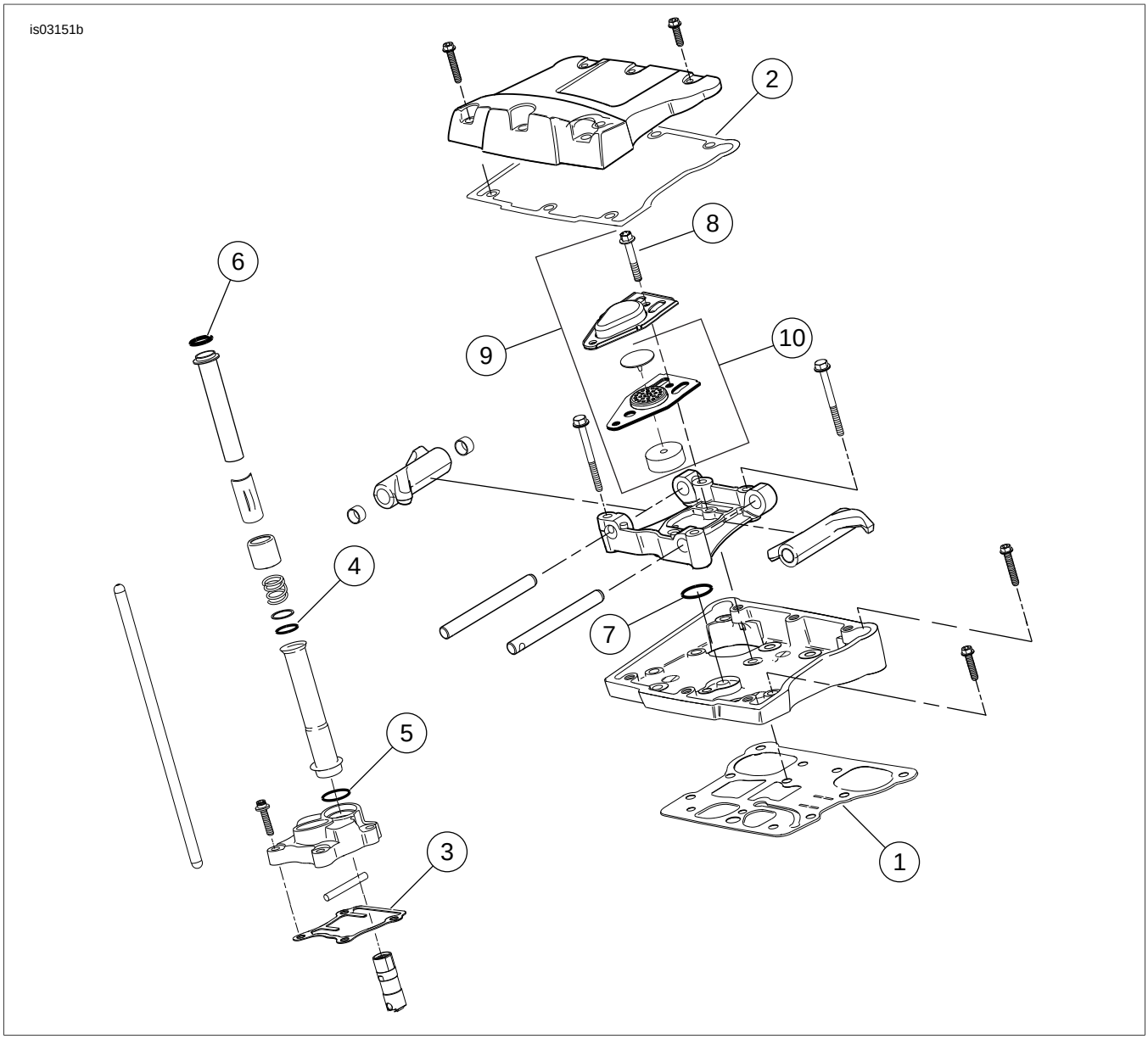


Figure 14. Service Parts: Screamin' Eagle Big Bore Stage 1 Kit

Table 2. Service Parts: Screamin' Eagle Twin Cam 103 (1690 CC) Conversion Kit

Item	Description (Quantity)	Part Number		Item	Description (Quantity)	Part Number
1	Gasket, rocker cover base (2)	16719-99A		10	Baffle assembly (2)	26500002
2	Gasket, rocker cover top (2)	17386-99A		11	Product information label (Not Shown)	Not Sold Separately
3	Gasket, tappet cover (2)	18635-99B		12	Seal, exhaust (Not Shown)	17048-98
4	O-ring, middle push rod cover (4)	11132		13	Seal, EFI intake (2) (Not Shown)	26995-86B
5	O-ring, lower push rod cover (4)	11145		14	Seal, map sensor (Not Shown)	11291
6	O-ring, upper push rod cover (4)	11293		15	Spring, clutch diaphragm (Not Shown)	37951-98
7	O-ring, rocker arm support (2)	11270		--	Breather assembly (includes items 8 through 10)	17025-03A
8	Bolt (4)	4400				
9	Breather assembly	17025-03A				

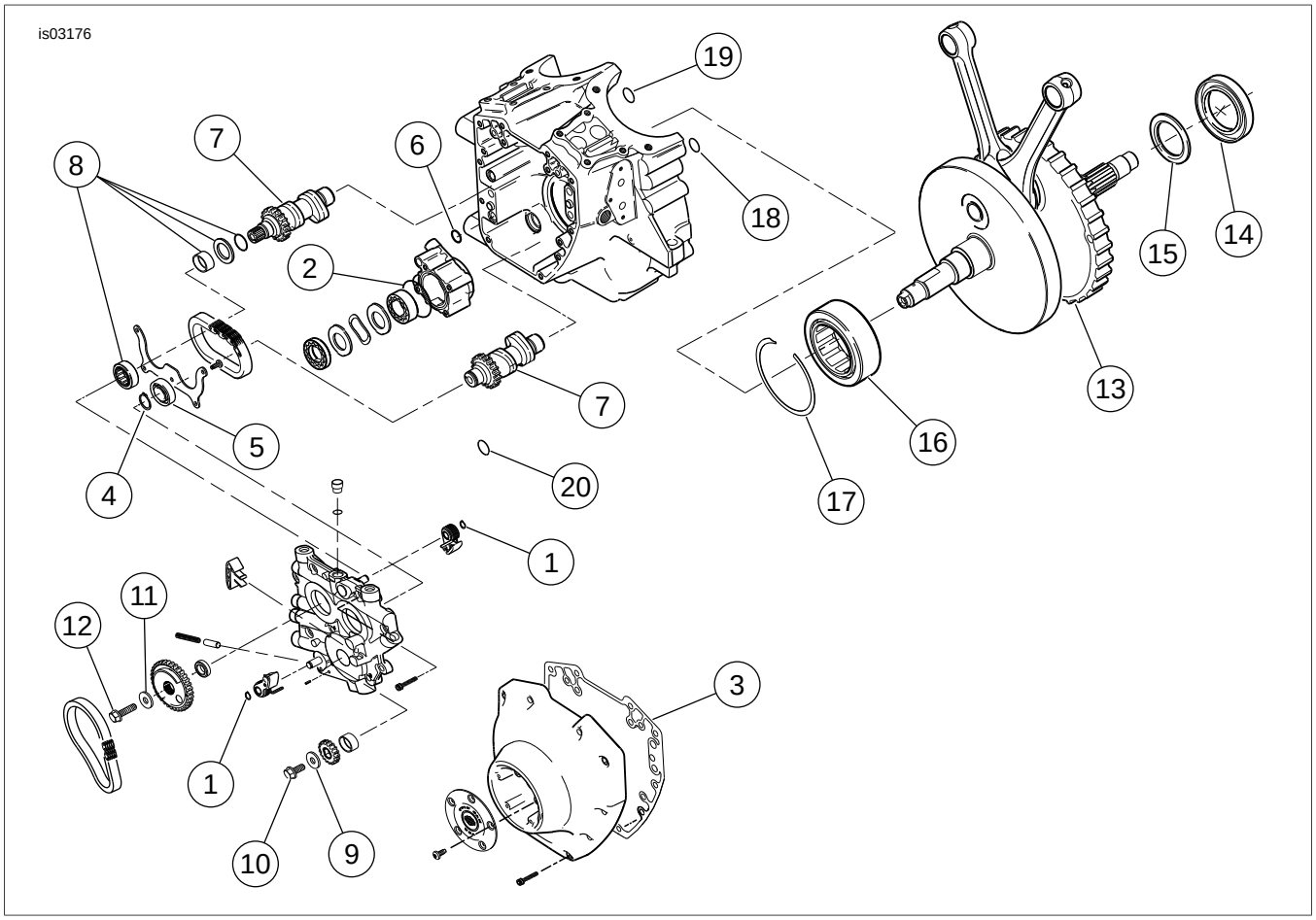


Figure 15. Service Parts: Screamin' Eagle Twin Cam 103 (1690 CC) Conversion Kit

Table 3. Service Parts: Screamin' Eagle Twin Cam 103 (1690 CC) Conversion Kit

Item	Description (Quantity)	Part Number		Item	Description (Quantity)	Part Number
1	Retaining ring, camshaft (2)	11031		12	Capscrew, flanged (rear cam)	996
2	O-ring, oil pump to cam plate	11286		13	Flywheel assembly	23740-03B
3	Gasket, cam cover	25244-99A		14	Seal, main bearing oil	12068
4	Retaining ring, camshaft	11494		15	Washer, thrust sprocket shaft main bearing	8972
5	Ball bearing, front camshaft	8990A		16	Bearing, main (2)	24604-00D
6	O-ring, cam plate to crankcase (2)	11301		17	Retaining ring, internal	35114-02
7	Camshaft kit	25376-03		18	O-ring, crankcase ring dowel (2)	26432-76A
8	Roller bearing kit, rear camshaft	8983		19	O-ring, piston cooling (2)	11140
9	Washer (crank) (2)	Not Sold Separately		20	O-ring, CPS	11289A
10	Capscrew, flanged (crank)	Not Sold Separately		21	Loctite 262 (red), 0.5 ml packet (Not Shown)	Not Sold Separately
11	Washer (rear cam)	6294		Notes: Items 9 and 10 are only available as part of Cam Drive Retention Kit 25533-99A. Loctite (item 21) is only available in 6 ml tube, part number 94759-99.		

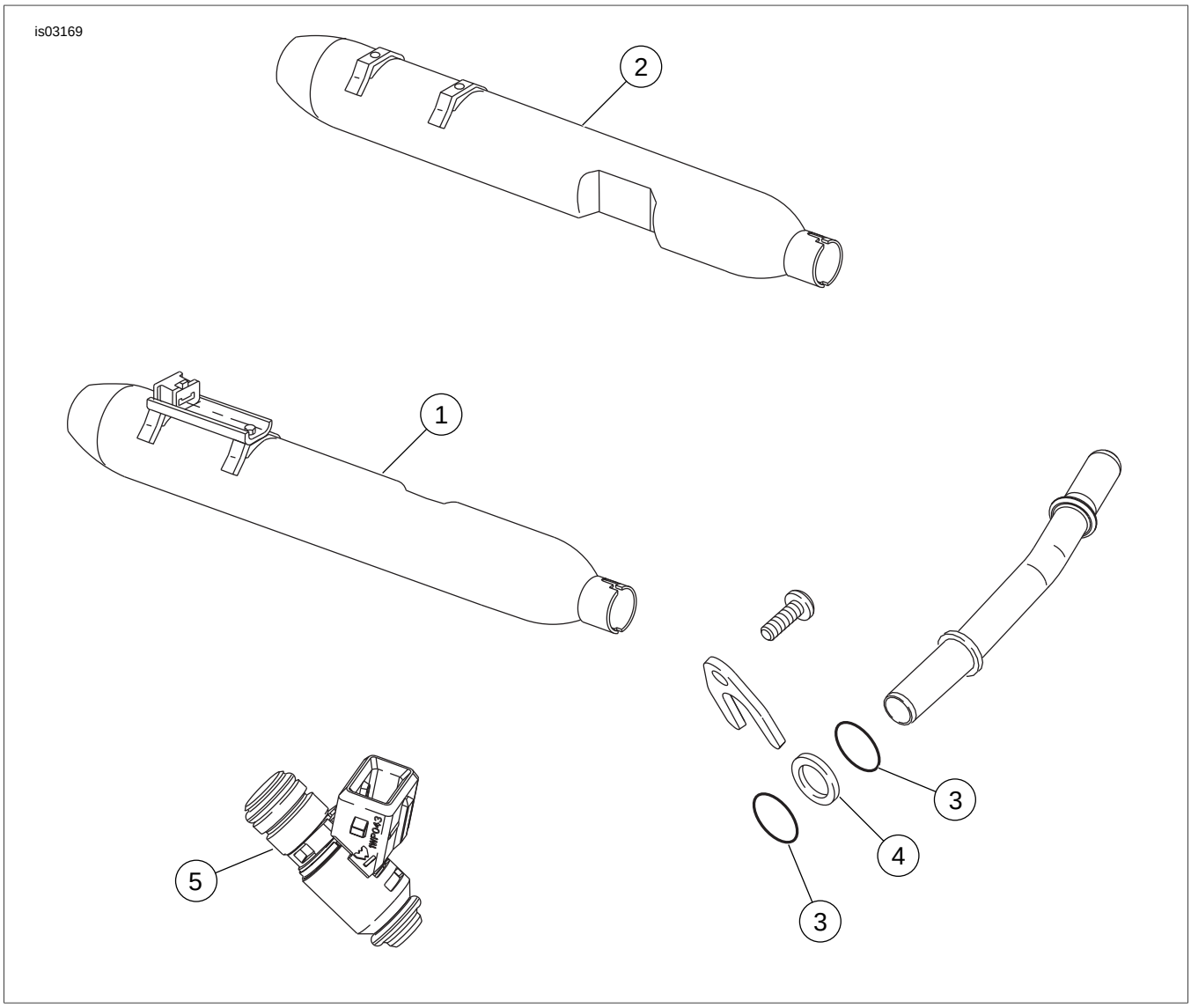


Figure 16. Service Parts: Screamin' Eagle Twin Cam 103 (1690 CC) Conversion Kit

Table 4. Service Parts: Screamin' Eagle Twin Cam 103 (1690 CC) Conversion Kit

Item	Description (Quantity)	Part Number
1	Muffler assembly, R.H. (with end caps)	66077-06
2	Muffler assembly, L.H. (with end caps)	66012-06
3	O-ring, fuel supply tube (2)	27680-06
4	Sealing washer, fuel supply tube	27681-06
5	Fuel injector (2)	27709-06
6	Element, filter (Not Shown)	29509-06